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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/690,317

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Hyun T. Kim

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EXAMINER

GUERRERO, MARIA F

ART UNIT

PAPER NUMBER

2822

DATE MAILED: 01/25/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/690,317	<b>Applicant(s)</b> KIM ET AL.	
	<b>Examiner</b> Maria Guerrero	<b>Art Unit</b> 2822	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 27 December 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 19-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 19-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

1. This Office Action is in response to the Amendment and the Request for continued examination filed December 27, 2005.

#### **Status of Claims**

2. Claims 1-18 and 22-33 are canceled. Claims 19-21 are pending.

#### ***Continued Examination Under 37 CFR 1.114***

3. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on December 27, 2005 has been entered.

#### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 19 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Park et al. (US 5,296,400) in view of Ravi et al. (US 6,548,313).

Park et al. shows a method of fabricating a transistor source/drain connection between adjacent transistor gate structures (Abstract). Park et al. discloses depositing a

filler material at least in a region between the adjacent transistor gate structures (Fig. 2B). Park et al. teaches removing the filler material with a process having removal selectivity to nitride greater than 40:1 to form a contact opening and depositing a conductive material (polysilicon) in the contact opening (Fig. 2D-2F, col. 4, lines 10-25, col. 52-65). Park et al. shows the filler material being a continuous layer (Fig. 2B-2D).

Park et al. does not specifically show depositing and planarizing an amorphous carbon filler material. However, Ravi et al. teaches depositing and planarizing the amorphous carbon filler material between adjacent transistor gate structures as well known in the art (Fig. 4-5A, 9B, col. 2, lines 60-65, col. 3, lines 1-6, 24-60). Ravi et al. shows the amorphous carbon filler material being a continuous layer that is planarized before being etched (Fig. 4, col. 3, lines 1-6, 24-60, col. 4, lines 50-60).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Park et al. reference by including the amorphous carbon filler material and the planarizing step as taught by Ravi et al. in order to facilitate the etching process and to improve etch selectivity (Ravi et al., col. 3, lines 1-6).

5. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wei et al. (US 6,423,645) in view of Ravi et al. (US 6,548,313).

Wei et al. shows a method of fabricating a transistor source/drain connection between adjacent transistor gate structures (col. 3, lines 50-60). Wei et al. discloses depositing an amorphous carbon filler material at least in a region between the adjacent transistor gate structures (col. 3, lines 8-17, col. 4, lines 27-35). Wei et al. teaches selectively dry developing the carbon filler material to form a contact opening and

depositing a polysilicon material in the contact opening (Abstract, Fig. 7, col. 1, lines 5-20, col. 3, lines 60-67, col. 4, lines 27-35).

Wei et al. does not specifically show planarizing the amorphous carbon filler material such that the planarized amorphous carbon filler material remains only between the adjacent transistor gate structures. However, Ravi et al. teaches planarizing the amorphous carbon filler material such that the planarized amorphous carbon filler material remains only between the adjacent transistor gate structures (Fig. 4-5A, 9B, col. 2, lines 60-65, col. 3, lines 1-6, 24-60). Ravi et al. shows the amorphous carbon filler material being a continuous layer that is planarized before being etched (Fig. 4, col. 3, lines 1-6, 24-60, col. 4, lines 50-60).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Wei et al. reference by including the planarizing step as taught by Ravi et al. in order to facilitate the etching process (col. 3, lines 1-6).

6. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Park et al. (US 5,296,400) in view of Ha (U.S. 6,451,708) and Ravi et al. (US 6,548,313).

Park et al. shows a method of fabricating a transistor source/drain connection between adjacent transistor gate structures (Abstract). Park et al. discloses depositing a filler material at least in a region between the adjacent transistor gate structures (Fig. 2B). Park et al. teaches removing the filler material with a process having removal selectivity to nitride greater than 40:1 to form a contact opening and depositing a conductive material in the contact opening (Fig. 2D-2F, col. 4, lines 10-25, col. 52-65).

Park et al. does not specifically show depositing and planarizing an amorphous carbon filler material. However, Ravi et al. teaches depositing and planarizing the amorphous carbon filler material between adjacent transistor gate structures as well known in the art (Fig. 4-5A, 9B, col. 2, lines 60-65, col. 3, lines 1-6, 24-60). Ravi et al. shows the amorphous carbon filler material being a continuous layer that is planarized before being etched (Fig. 4, col. 3, lines 1-6, 24-60, col. 4, lines 50-60).

Park et al. does not specifically show the aspect ratio being greater than about 5:1. However, Ha shows forming a contact opening having the aspect ratio greater than about 5:1 (col. 6, lines 40-65).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Park et al. reference by including the amorphous carbon filler material and the planarizing step as taught by Ravi et al. in order to facilitate the etching process and to improve etch selectivity (Ravi et al., col. 3, lines 1-6) and to specify the aspect ratio being greater than about 5:1 as taught by Ha in order to obtain a high aspect ratio contact holes concurrently in the cell array a region and the peripheral circuit region without increasing the process steps and the cost (Ha, col. 2, lines 45-67).

### ***Response to Arguments***

7. Applicant's arguments filed December 27, 2005 have been fully considered but they are not persuasive. Claims 19-21 stand rejected because the amendment does not overcome the rejections and there is not evidence of criticality of unexpected results.

8. Applicant argued that the references cited would not result in a planarized amorphous carbon filler that is a continuous layer that remains only between the adjacent transistor gate structures. However, Park et al. shows the filler material being a continuous layer (Fig. 2B-2D). Ravi et al. shows the amorphous carbon filler material being a continuous layer that is planarized before being etched (Fig. 4, col. 3, lines 1-6, 24-60, col. 4, lines 50-60).

9. Furthermore, during patent examination, the pending claims must be "given \*>their< broadest reasonable interpretation consistent with the specification." > In re Hyatt, 211 F.3d 1367, 1372, 54 USPQ2d 1664, 1667 (Fed. Cir. 2000). While the claims of issued patents are interpreted in light of the specification, prosecution history, prior art and other claims, this is not the mode of claim interpretation to be applied during examination. During examination, the claims must be interpreted as broadly as their terms reasonably allow. > In re American Academy of Science Tech Center, F.3d, 2004 WL 1067528 (Fed. Cir. May 13, 2004)(The USPTO uses a different standard for construing claims than that used by district courts; during examination the USPTO must give claims their broadest reasonable interpretation.) < This means that the words of the claim must be given their plain meaning unless applicant has provided a clear definition in the specification. In re Zletz, 893 F.2d 319, 321, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989) >; Chef America, Inc. v. Lamb-Weston, Inc., 358 F.3d 1371, 1372, 69 USPQ2d 1857 (Fed. Cir. 2004). Therefore, the words "continuous layer" have been given their plain meaning because applicant has failed to provide a clear definition in the specification.

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10. In addition, "the use of patents as references is not limited to what the patentees describe as their own inventions or to the problems with which they are concerned.

They are part of the literature of the art, relevant for all they contain." In re Heck, 699 F.2d 1331, 1332-33, 216 USPQ 1038, 1039 (Fed. Cir. 1983) (quoting In re Lemelson, 397 F.2d 1006, 1009, 158 USPQ 275, 277 (CCPA 1968)). A reference may be relied upon for all that it would have reasonably suggested to one having ordinary skill the art, including nonpreferred embodiments. Merck & Co. v. Biocraft Laboratories, 874 F.2d 804, 10 USPQ2d 1843 (Fed. Cir.), cert. denied, 493 U.S. 975 (1989). See also Celeritas Technologies Ltd. v. Rockwell International Corp., 150 F.3d 1354, 1361, 47 USPQ2d 1516, 1522-23 (Fed. Cir.1998).

11. Finally, the transitional term "comprising", which is synonymous with "including," "containing," or "characterized by," is inclusive or open-ended and does not exclude additional, unrecited elements or method steps. See, e.g., > Invitrogen Corp. v. Biocrest Mfg., L.P., 327 F.3d 1364, 1368, 66 USPQ2d 1631, 1634 (Fed. Cir. 2003) ("The transition comprising' in a method claim indicates that the claim is open-ended and allows for additional steps."); < Genentech, Inc. v. Chiron Corp., 112 F.3d 495, 501, 42 USPQ2d 1608, 1613 (Fed. Cir. 1997) ("Comprising" is a term of art used in claim language which means that the named elements are essential, but other elements may be added and still form a construct within the scope of the claim.); Moleculon Research Corp. v. CBS, Inc., 793 F.2d 1261, 229 USPQ 805 (Fed. Cir. 1986); In re Baxter, 656 F.2d 679, 686, 210 USPQ 795, 803 (CCPA 1981); Ex parte Davis, 80 USPQ 448, 450



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(Bd. App. 1948) ("comprising" leaves "the claim open for the inclusion of unspecified ingredients even in major amounts").

### ***Conclusion***


12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Lim et al. (US 6,380,106) (of record) is cited as evidence to show that the use of amorphous carbon as a filler material is conventional in the art.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Maria Guerrero whose telephone number is 571-272-1837.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Zandra Smith can be reached on 571-272-2429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

January 17, 2006

  
**MARIA F. GUERRERO**  
**PRIMARY EXAMINER**